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NEW-YORK STATE MED.

AND

MEMBERS OF THE LEGISLATURE,

AT THE

CAPITOL, FEBRUARY 6, 1850,

BY

ALEXANDER H. STEVENS, M. D., LL. D.

PRESIDENT OF THE SOCIETY.

ALSO, PRESIDENT OF AND EMERITUS PROFESSOR OF SURGERY IN THE COLLEGE OF PHYSICIANS AND SURGEONS OF NEW-YORK; CONSULTING SURGEON OF THE NEW-YORK HOSPITAL, AND OF THE BELLEVUE HOSPITAL, AND OF THE LUNATIC AND NURSERY HOSPITALS ON BLACKWELL'S ISLAND; HONORARY MEMBER OF THE MEDICAL SOCIETY OF MASSACHUSETTS AND NEW JERSEY, MEXICO, &c.

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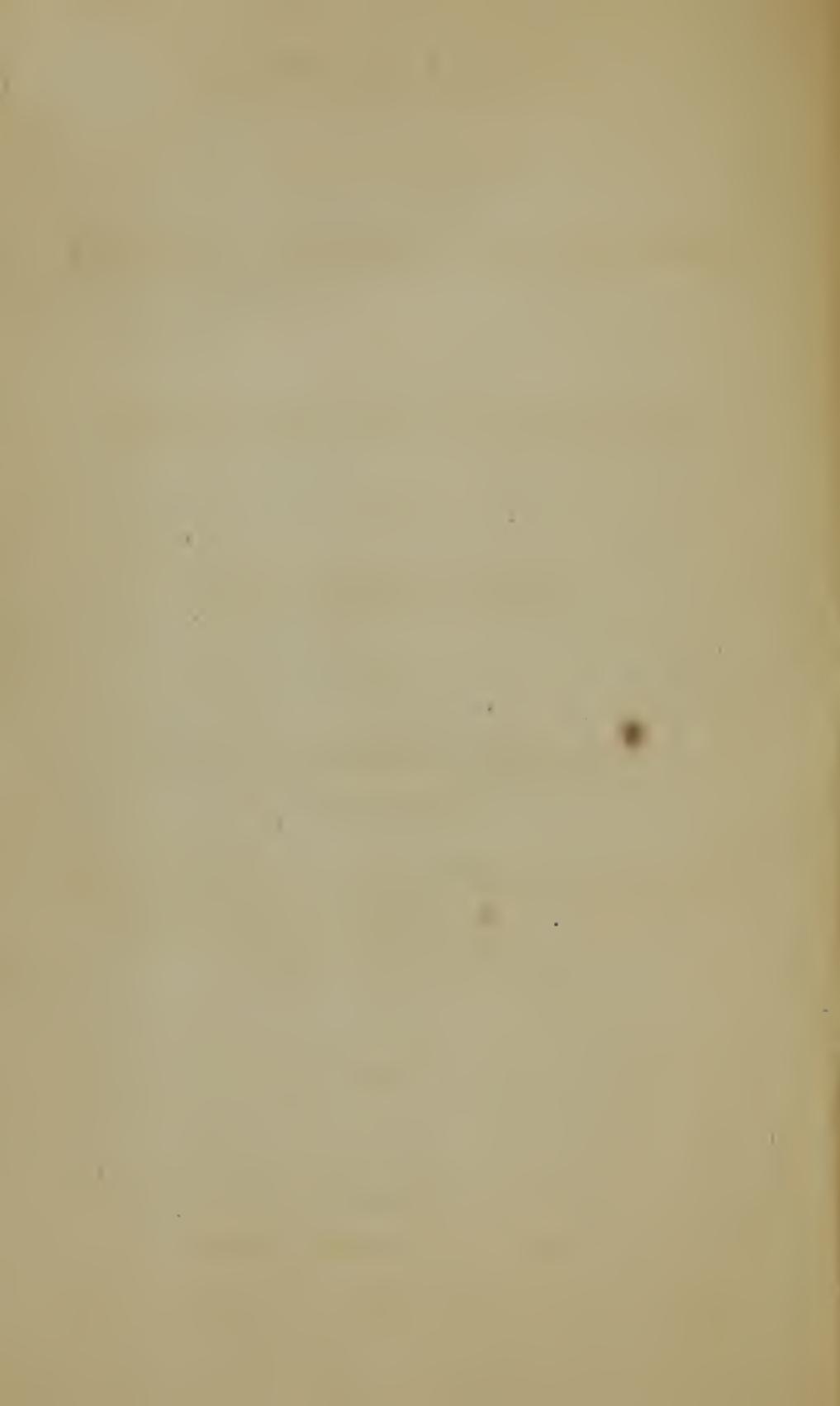
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ANNUAL ADDRESS

DELIVERED BEFORE THE

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A D D R E S S.

In a former address from this place, I endeavored to show that the health of the community greatly depends on the skill and learning of its physicians, and that a well educated faculty of medicine is essential to the well being of society. Vastly important to the State is it, that those who are charged with the care of the health and lives of the people, should fully understand the use of all the remedies and appliances suited to the prevention and cure of diseases and injuries, and the alleviation of human infirmities. Men thus instructed, and performing their high duties skilfully, openly and honestly, are alone entitled to be called physicians. They make no false pretences, are governed by no fanciful theories, do not restrict themselves to the use of one class of remedies, practice no concealment, invoke no supernatural agencies to impose on a credulous public. Such, honorable legislators, is the character of the medical men here convened by your direction, and seeking to extend their knowledge by social intercourse, and by written histories of diseases. In their keeping are your own lives and those of your families. In your season of sickness your physician is your hope ; in your final hour you will look up to him as your best friend. You have organised medical men into societies. Rightly do you honor their profession. For this you have the example of the greatest men of ancient and modern times, and the warrant of scripture.

The care of the health and lives of our fellow creatures, is surely a noble occupation. It is not my purpose to pronounce an elabo-

rate eulogy on the science we cultivate and the art we practise. Let it suffice that our profession is concerned for man at his birth, and even before his birth ; it follows him through infancy and childhood, through manhood and old age ; aiming to protect him from disease, to increase his strength, assuage his pains, and diminish his infirmities ; and to administer comfort and relief under all exigencies, and under all circumstances, till exhausted nature sinks into the grave.

The whole of human life therefore, with all its changes, whether progressive or occasional, is the subject of our meditation and the object of our labor and our care. Man thus becomes the great study of our profession : his physical formation, his intellectual powers, the effects of the mysterious connexion in his being between mind and matter ; the inscrutable nature of his principle of life ; his adaptation to social and domestic relations ; his moral tendencies and his religious capacities ; the double nature which makes him, while a child of earth, an heir of immortality—all these belong to that study and contemplation of man to which our daily vocation leads us.

And, while the subject of the studies and the labors of our profession is the noblest of God's creation on earth, the preservation of his life and health, his morals and his happiness, its one great object, not less is it distinguished by the vast extent of its collateral relations, and the mighty and immense range of agencies and instrumentalities it employs. It contemplates the qualities and conditions of all inanimate substances, of all living things, of all things immaterial, intangible, imponderable.

For her remedies, medicine searches thro' all the works of nature, flies over the surface of the whole globe, penetrates beneath the surface, studies, examines, analyses every animal, every vegetable, every mineral production. Receiving their collections from the geologist, the botanist and the zoologist, whom she has sent out to explore the kingdoms of nature, she places them in the hands of her chemist to analyze and to combine ; and even employs him to make new combinations which nature does not afford ; and all this for the **HEALTH OF MAN.**

Thus extended her researches, thus minute her investigations, and such the purpose of the high, noble and deep studies and pur-

suits within the proper sphere of that glorious profession to which we have devoted ourselves, we should be little worthy of respect did we not pursue it with becoming zeal. We do so, and our predecessors have done so before us, even from the earliest record of man's history. In the Mexican war our surgeons dressed their wounded in the very front of the battle, and were wounded and killed while thus discharging their duties. In the recent pestilence many of our profession rushing into its midst, devoted themselves as martyrs ; martyrs without hope of reward ; without the encouragement and animation derived from the presence of others, as on the battlefield, and at the stake ; without the chance of being enrolled on the calendar of saints, or receiving the public approbation of their countrymen ; in lonely dwellings and dark cellars, with no eye upon them save His alone who seeth all things.

Now I submit to you whether this society, the recognized organ of their profession may not, even amidst your other important and pressing duties claim to arrest your attention, while seeking to promote one of the great objects of their organization.

In discharging the duties imposed upon me, I have selected as the topic of this address, *The Public Health*; chosen because appropriate to the studies of the learned members of the society, pertaining to the duties of legislators and suited to the especial wants of the times.

The subject of the *Public Health* has from the earliest ages engaged the attention of all civilized nations. Among the Hebrews sanatory regulations were associated with religion.

The Greeks, in the zenith of their civilization, knew little of what are called the comforts and luxuries of many modern habitations, the enjoyment of which are often a fruitful source of disease among us ; yet they excelled perhaps even our modern trainers in the art of giving physical strength. In Sparta, the young girls as well as the young men were habituated to athletic exercises, and all were subjected to a regimen of strict sobriety. Gymnastic exercises and the habitual use of the baths, both among the Greeks and Romans, contributed largely to their physical developement, the preservation of high health and of that vigor of mind and body which made them so superior to other nations.

The Greeks sought their happiness in the study of Philosophy and Science, in preference to animal enjoyments, and were, what we are not, where most, we should be at our meals, especially, an eminently social people.

The house of Romulus, the founder of Rome, was built of earth, and covered with straw. During the first four centuries after the foundation of the city, the houses of Rome were a collection of miserable huts, built without regular arrangement into streets, according to the caprice of the owners,* yet the Romans constructed magnificent aqueducts for bringing water from distant sources for their baths, and they had extensive sewers leading from them to the Tiber. Ancient Rome had public temples of cloacina, and had also public urinaries appendent to her baths, and the whole, as with the Greeks, with all the other establishments for the public health, were confided to the highest magistrates, censors, consuls, and emperors. At a later period, a distinct office was created, which was conferred on the most illustrious of her citizens, “*Ædiles curatores regionum urbis, et curatores viarum.*” The Romans had their private cabinets. It was in one of these that the emperor Heliogabalus was killed. The law of the twelve tables ordained that no corpse should be burnt, or buried in the city,” *hominem mortuum in urbe neve urito, neve sepeleto.*” Under the republic, the streets of Rome were not paved. Appius Claudius Cœcus, the censor, whose name yet lives in the “Appian Way,” first caused to be paved and widened the streets which led across the fields towards Capua ; but most of the streets of Rome were at this time unpaved. Nero burnt down a large portion of the ill constructed part of the city, and rebuilt it after a more regular plan. He directed the straight streets to be eight feet wide, and the crooked, sixteen. These were Roman feet, each equal to about twenty of our inches. The learned author of “*Architectural Antiquities of Rome,*” expresses the opinion, “That if the river Tiber had not become obstructed, the sewerage of Rome would have been perfect at this day.”† The Coloseum exhibits a practical knowledge of the laws which regulate running water. The amphitheatre at Verona exhibits an

* Monfalcon and De Poliniere—*Traité de la Salubrité.*

† See Report of Metropolitan Sanitary Commission.

application of the art of draining by a well sunk in the centre : an attention to due drainage and consequent stability of foundation unknown in modern times. The same author is of opinion that the leaning tower of Pisa would not have settled to one side, had the ground been thus duly drained under its foundation. The fact is important as showing the depth to which the earth is influenced by drainage.

After the sacking of Rome by the barbarians, everything fell into disorder. The sewers became obstructed, and the marshes undrained ; so that from the 7th to the 14th century, no important measures of sanitary police having been adopted, frightful pestilences recurred almost periodically and desolated the population. The superstition of the times attributed them to fiery comets and meteors ; hence the term "*meteoration*," and meteoraceous diseases, by the use of which, and the word epidemic, even in our own times, some think they afford a very satisfactory explanation of the recurrence of wide-spread diseases ; which reminds me of the custom of attributing to witchcraft, in a former period of our history, (even during my own school days in Connecticut), many occurrences that could not be otherwise accounted for.

In more modern times, the attention of European governments, especially those of France, Russia and Great Britain, has been and now is earnestly directed to this subject. In Great Britain, various parliamentary and local commissions within the last ten years acting upon the result of statistical enquiries in respect to the mortality of particular districts and occupations throughout the three kingdoms and the statements and opinions of eminent medical and scientific men as to the causes and best modes of removing the sources of unnecessary mortality and disease, have greatly improved the public health, and have collected a mass of information of the highest order and value to all civilized communities. In Massachusetts, our noble and generous rival in matters of education and philanthropy, this subject has for several years engaged the attention of the medical profession and of others, among whom it would be unjust not to mention Lemuel Shattuck. In the transactions of the American Medical Association for the year 1849, are most able reports on hygiene, by Dr. Wynne, of Baltimore, and

his coadjutors.* The report of the board of health of the city of New-York, in relation to the recent epidemic is a document of great interest on this subject.

The objects of all sanitary measures are, 1st. The exclusion of disease. 2d. The limiting its progress when admitted or generated amongst us. 3d. The removal of the causes by which it is generated, and this presupposes, 4th. An inquiry into the sanitary condition of the people and sources of disease.

The more prominent evils of our social condition in relation to public health are, 1st. Those which arise from the defects of our quarantine. 2d. From the imperfect drainage of surface water, of spring water and of impurities. 3d. From ignorance or the want of proper attention to the means of rendering dwellings healthful in the heating, lighting and ventilating of them. 4th. From the construction of mills, canals, railroads, &c., in such manner as to arrest the natural course of water towards the ocean. 5th. From unhealthful manufacturing establishments and occupations and from improper burial of the dead. 6th From the want of due ventilation of yards, low grounds and confined places out of doors. 7th and lastly, from the want of a more complete protection against small pox by enforced vaccination. What remains of the sanitary art belongs to medical men individually.

The fundamental principles of sanitary regulations should be to promote and to protect the health of the people without infringing on the rights of industry or of property or unnecessarily on private interests.

There are two aspects in which the subject, PUBLIC HEALTH, may be viewed, 1st. The moral, the religious and the political aspect. 2d. The commercial or the financial aspect.

I prefer to confine my views chiefly to the financial aspect of the subject; not because it is the most important, but because it is the most exact. It may be expressed in figures, it admits of no caviling; it cannot be gainsaid. Let me present a single instance as an

* Drs. James Wynne, Baltimore, Chas. P. Gage, Concord, N. H., John M. Thomas, Washington, D. C., Isaac Parrish, Philadelphia, P. C. Gaillard, Charleston, S. C., L. P. Yandell, Louisville, Ky., J. P. Harrison, Cincinnati, Ohio, Albert Smith, Peterborough, N. H., Josiah Curtis, Lowell, Mass., Edward H. Barton, New Orleans, John H. Griscom, New York, E. D. Fenner, New Orleans.

illustration. An individual or a company obtain the privilege of erecting a dam, and establishing a manufactory. The undertaking may prove to be very profitable to some of those concerned and apparently so to all. Let us view the matter in a medical aspect. The back water, by preventing the due drainage of a tract of country, diminishes its agricultural productiveness, causes manifest sickness and mortality, and insidiously undermines the constitution of the inhabitants rendering them weak in body and in mind. Furthermore, the operatives in the supposed manufactory are not so well fitted to make good citizens, are more subject to disease, and die in greater proportion than agricultural laborers. The children there engaged may become idle, vicious or criminal. Now idleness is impoverishing to the State; vice still more so, and crime is exceedingly expensive to deal with. Men are withdrawn from other and productive labor to detect and arrest the criminals; prisons must be built to detain them; citizens are called from their avocations to serve as grand jury men; there is an array of paid lawyers and judges, with officers, jurymen and witnesses, and sometimes of physicians, all of whom are thus hindered from directly adding by their labor to the wealth of the State, during the time thus occupied. The expense of hanging one might save many from the gallows. The sick too become charges upon State or private charity; they fill your hospitals and crowd your dispensaries. Thus it is easy to see that an undertaking such as I have supposed may be a drain to the wealth of the State, even though it enrich an individual. When petitioners for water privileges have responded to this financial view of the subject, then will come a consideration of its moral and religious aspects; the pain and the sorrow of premature and untimely death; the wailing of the widow; and perchance the yet more touching playfulness of orphans over the bier of their departed parent.

Now this is only one among a hundred of avoidable causes of disease among us. A volume might be filled with proofs and illustrations of the shortening of human life, and the unfitting of men for labor by a want of due knowledge on the one hand, and of due legislation on the other. Even in Massachusetts, where marsh fevers are not so rife as with us, or so readily induced by stagnant water, the canal near Springfield caused so much sickness that it was indicted, presented by a grand jury, and its location changed in consequence.

Now let us look at other sources of disease. According to M. Dumas, a man changes into carbonic acid in one hour, all the oxygen contained in ninety litres (about $3\frac{1}{2}$ cubic feet) of air, and the volume of all the air expired, which is about 13 cubic feet, contains about 4 per cent of carbonic acid. The quantity of heat disengaged, is equal to that arising from the burning of as much charcoal as the blood loses of carbon. Thus every breathing individual is a small furnace, fed by the air, and discharging its smoke into the room. Now suppose two thousand such living furnaces collected, as I have recently known in the city of New-York, in a newly built church, imperfectly ventilated, each burning nearly $\frac{1}{4}$ of an ounce of charcoal every hour, 1000 ounces, or 83 lbs., during a two hours service ; and this in addition to the admixture in the same atmosphere of sulphuretted hydrogen and ammonia from the surface of the body, and the further deterioration of the air by gas light. Is it to be wondered at that faintings and permanent sickness should follow such assemblies ? The common mode of suicide in Paris, is by breathing the vapor of burning charcoal. The burning the carbon of our bodies and breathing its noxious gases in close and ill ventilated apartments, is only a slower suicide.

It has been ascertained that in the county of Rutland, England, the average longevity is 52 years. Among the poor in Liverpool, it is only 15 years. Of the poor children in the city of Boston, 32 per cent die before the age of 2 years ; of the others, only 13 per cent. There is no reason to doubt that the mortality in our large towns, especially in the city of New-York, is even greater than this. These statements belong to the science of VITAL STATISTICS.

The greatest outlets to human life in this State, are the numerous train of diseases arising from vegetable and animal decomposition ; this includes : 1. Biliary fevers of all kinds, remittent and intermittent, dysentery and other febrile diseases, which under various popular names are universally recognized as of paludal or marsh origin. 2. Those from animal poison, called typhus, and typhoid and puerperal. And lastly, those arising from a mixture or successive action of the two on the same individual.*

* The distinction between these classes of fevers is best appreciated by attending to their causes and the mode of cure. Thus, when typhus occurs at sea, in clean vessels, or in regions and at times in which all vegetable decomposition is arrested by severe cold, it furnishes the most unequivocal type of that disease. Typhus is not paroxysmal, and it is especially benefited by antiperiodical remedies; it runs a limited course, and is communicable. The remittent, intermittent

Both classes of these noxious agents not only produce fully developed fevers, but various other diseases, (which in the bills of mortality appear under other heads,) such as erysipelas, &c. ; also a very lengthened list of chronic maladies, as dyspepsia, diseases of the liver, neuralgia, dropsy, &c., and lastly by their more slow and gradual action, without acknowledged sickness, a whole population may be more or less physically deteriorated, unfitted for labor, incapable of attaining old age and of transmitting health to their offspring.

The effect of habitually breathing an atmosphere charged with impurities, in close, crowded rooms, and also that arising from the decomposition constantly taking place, during the summer especially, in filthy cities, the larger part being the putrefaction of animal matters, (and which I shall designate as the *typhoid atmosphere*,) is the production of depression and weakness. For although bleeding is sometimes admissible in typhus fever, it is for the relief of some local congestion, some symptom of the disease which is not the disease itself. In the large cities of Europe no diseases bear bleeding as they used to do here, and as in a less degree they do at the present time. In London and Paris, erysipelas requires stimulating treatment. Here formerly it used to require bleeding, now a mixed treatment is found to be best.

The citizens of London drink largely of malt liquors and wine, and other alcoholic drinks, and to a very considerable extent they do so of necessity, to sustain themselves under the influence of foul air.* Now this typhoid atmosphere exists in all our large cities, and will become more or less virulent, exactly according to the degree of attention that may be paid to sanitary measures, public and private ; and the use of strong drinks will keep pace with it.

When I was a young surgeon, in view of the great success that attended capital operations in New-York, and our attempts to save mangled limbs without amputation, I was led to imagine that the

or marsh fevers, and in a lesser degree the mixed form have no definite duration, and are more under the control of quinine and that class of remedies. Extreme heat decomposes the typhus poison; cold arrests the formation of paludal or vegetable poison. The typhus poison rises to the upper part of rooms and buildings, the paludal poison hovers near the ground.

* The greater moisture of the English climate renders the system more tolerant of strong drinks than our drier air.

American constitution was more hardy than the European, and that our climate conferred new hardihood on European emigrants. But all this has changed. Now I find foul air in our cities and hospitals producing the same state of things that I witnessed thirty-five years ago in London and Paris.

The insidious influence of the typhoid atmosphere modifies all other diseases, renders them more liable to become protracted or incurable, makes depletion (urgently demanded by local inflammation) a dangerous remedy, and very greatly increases the chances of death or mutilation after injuries by external violence.

The habitual breathing of it, as I have already stated, when it does not induce consumption or typhus fever, enfeebles the constitution, and renders it obnoxious to other diseases of all kinds. If you would have your population temperate and healthy, let them enjoy the exhilarating influence of sunshine and fresh air. Alcoholic stimulants are not then so necessary. Now what is true in a small degree of all the inhabitants, and especially the children in crowded localities, is in various degrees true of literary and professional men in their offices, children in schools, of labourers in manufactories, work shops, and of all who sleep in confined rooms, and houses with hot air furnaces, without adequate ventilation.

Among literary and professional men, sedentary pursuits do not in England, says Professor Guy, shorten life. "There is no other cause to be assigned for the great prevalence of consumption among those who labor in workshops, than vitiated air."

The Registrar-General reports nearly 60,000 deaths from consumption every year, in England and Wales. Professor Guy thinks 36,000 only of these are true consumption, of which he believes 5,000 might be annually saved, and half the number in London. One-sixth of the whole are among the laborers; he attributes these to the foul air of the work shops, the remainder to the condition of the dwellings of the poor. Deficient ventilation produces more consumption than all the other causes put together. Intemperance is the next greatest cause of the shortening of human life. "The unwholesome state of the air in the work shops, especially printing offices and tailor's shops is the great cause of intemperance among the workmen."

Dr. Guy gives the following table, illustrating the influence of want of ventilation among letter press printers.

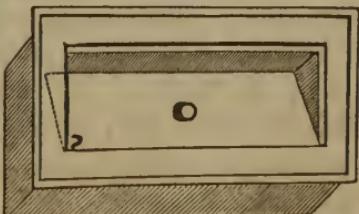
	Spitting of blood.	Catarrh.	Other diseases.	Total.	Spitt'g of blood.	Catarrh.	Other diseases.	Total
104 men, having less than 500 cubic feet of air to breathe,.....	13	13	18	44	12.50	12.50	17.31	42.31
115 men having 500 to 600 cubic feet of air to breathe,.....	5	4	23	32	4.35	3.48	20.00	27.82
101 men, having more than 600 cubic feet of air to breathe,.....	4	2	18	24	3.96	1.98	17.82	23.76

Sir James Clark, who has written the best work on consumption in the English language, says, the respiration of a deteriorated atmosphere is one of the most powerful causes of tuberculous cachexia, the medical term for the state that precedes consumption. He says, "if an infant born in perfect health, and of the healthiest parents be kept in close rooms, in which free ventilation and cleanliness are neglected, a few months will often suffice to induce tuberculous cachexia. Children raised in workhouses and similar establishments almost always become scrofulous, more from bad air, than defective nourishment."

Mr. Toynbe testifies before the sanitary commission that the poor who had ventilators introduced in their rooms say, "they are more comfortable and airy," "that smells are no longer perceived," "they are more grateful for the ventilators than for milk and flannel." *First Sanitary Report*, p. 337.

In the Norwood school were six hundred pupils. Scrofula broke out extensively among them. It was attributed to bad and insufficient food. Dr. Arnott was consulted. He attributed it to foul air. Ventilation was introduced, and the scrofula disappeared. Eleven hundred are now maintained in good health, where before six hundred were sickly. See Mr. Toynbe's testimony, report of sanitary committee.*

*The subjoined figure shows the ventilator of Dr. Arnott, which is of the size of a brick, and is placed in the chimney breast near the ceiling, opening into a flue, and may be closed when desired.



Not being able to understand the mechanism of it, I have had made another, in which the valve is balanced by a weight on the outside.

Tubercular consumption and scrofula (supposed by many to be the cause of it,) with their diseases of the various internal organs, and of the joints and bones, rarely appear unless inherited, or as a consequence of avoidable causes. 1. Convulsions, cholera infantum and many other diseases of childhood, rarely affect children of healthy parentage, brought up according to the known rules of good physical education. 2. Of those diseases which are more connected with vicissitudes of temperature, and therefore rather less within the reach of preventive means, such as the simple inflammatory diseases, they also are less apt to occur among persons hardened by fresh air, suitable diet and regimen.

The introduction from abroad and the spread of contagious diseases is a fruitful source of mortality. The duty of the State is not alone to adopt means for diminishing the generation and extension of disease; proper care should be taken to exclude it.

I have now enumerated what I regard as the sources of more than half our mortality from ordinary causes. If this amount of disease and mortality, and vice, let me add, and crime, were a necessary consequence of our condition, and without remedy, or remediable by physicians, we should have no right to claim for them the attention of legislators. If there be any who think that it is exclusively the business of the medical profession to look after the health of the people, to teach all that is useful to be known concerning endemic influences and unhealthful occupations, and that the Legislature have enough to do in making laws and regulating the police of the State; to them it may be replied that the care of the health of their individual patients, is the source of the support of medical men and their families, and that even if they could afford to give their time to public objects without compensation, legislation would still be required.

Lord Morpeth remarked in Parliament in April, 1847, that in the various large towns in England, there were above 70,000 cases of unnecessary sickness, and in London about 250,000 such cases, and 10,000 deaths annually that might have been prevented. "There are other items of expense," he very justly observes, "such as direct attendance on the sick, the loss of their labor, the premature death of productive contributors to the national wealth and the expense of premature funerals."

What the total amount of unnecessary, (and let me add as I believe, increasing) mortality in this State is, we have no precise means of knowing. In England it is estimated that of 300,000 deaths, only 35,000 are from the decay of nature.

Dr. Southwood Smith calculates the annual slaughter in England and Wales from preventive causes of typhus alone, among persons in the vigor of life, at double the amount that was suffered by the allied armies at the battle of Waterloo. In our Mexican war, among the volunteers, "the proportion of those cut down by sickness to those who fell in battle is as five to one."* They had not in all cases the services of surgeons as well educated as the army surgeons.

Dr. Playfair estimates the loss for the town of Manchester at one million of pounds sterling; that of London at two millions and a half; that for England and Wales little short of eleven millions; and that of the United Kingdom at twenty millions of pounds sterling every year. In some of the manufacturing towns in Great Britain, the number of children who die before they reach the age of productive usefulness, and who may be said to die indebted to the State, is greater than the productive wealth of their parents. In the State of New-York life and labor are of far greater value than in England, and our malarious and undrained country is far more unhealthy. In the cities of New-York and Boston the average of human life is very considerably shorter than in London. In Massachusetts it has been ascertained that the average period of life of those who survived the age of fifteen years, was thirty-nine years and seven months nearly. In this State, suppose the average duration of life to be 39 years. The productive period begins at fifteen, and allowing four years to pay the debts of childhood, there are left only twenty productive years. Every year therefore added to human life increases the productive wealth of the State nearly 5 per cent.

I am indebted to Archibald Russel, Esq., for the following reference to Carey's Political Economy, Part II., p. 285: "In estimating the average production at \$95 per head, or giving \$380 for

* See Gen. Taylor's address to the volunteers.

each family of four persons, we believe *we shall not vary materially from the truth.*"

Population of the State of New-York in 1840, 2,428,921.

Estimated population in 1850,..... 3,200,000, which, according to Carey at \$95, will be \$304,000,000. This is the gross sum of production, i. e., of production beyond waste, loss and consumption. Five per cent on this sum is the real amount added to the productive power of the state by the lengthening of life one year, and is equal to \$15,200,000.

This loss is from premature death; but death and sickness go together. It is estimated that for every death there are two years or seven hundred and thirty days of sickness and of lost labor, leaving out of view the expenses of attendance, the entire derangement in the course of labor in a whole family, which the sickness of one of its members occasions, there is a direct loss probably at least equal to that from death. In all, more than \$30,000,000.

The fact to which I would now call your attention is, that the causes of a large part of diseases are to a very great extent proved to be removable. The chief means, so far as the public is concerned, are drainage, cleanliness, the due warming and lighting of our apartments, the ventilation of them and our grounds. "The subject of the preservation of health," says Dr. Neil Arnott, "is rendered remarkably simple by the fact that in regard to all things over which we can exercise control, there are only four which man requires, air, temperature, aliment and exercise, and two which he should avoid, poisons and violence." To these I would add a quiet conscience and well regulated mind.

The means of preventing disease, are for the most part not such as require to be annually applied; although I have spoken of an annual loss, the expense of them would be far less than the interest of such annual loss, though the gain would be permanent.

At the opening of the present session of the British Parliament, Her Majesty, in her speech from the throne, used the following language: "Almighty God in his mercy has been pleased to arrest the progress of mortality, and to stay the fearful pestilence. Her Majesty is persuaded that we shall best evince our gratitude by vigilant precautions against the more obvious causes of sickness,

and an enlightened consideration for those who are most exposed to its attacks." For the first time in her history, the Governor of your State has made medical topics a prominent part of his message. This marks not more the character of those individuals than the spirit of the age. There is no country in the world where labor is so productive as in the United States, and it is not creditable to us that European nations, among whom human life is not of so much value to the State, should be in advance of us in the study of the means, and the enforcement of regulations for the preservation of health. We have the double motive of interest and humanity. Here the question of the *public health* is emphatically *THE question of the age*. It underlies all other philanthropic movements, whether designed to promote education, temperance or good morals. At school, a child is rendered listless and incapable of exercising the full powers of his mind by breathing a vitiated atmosphere. This is one of many ways in which the question of public health may be shown to underlie that of *education*. Again, the breathing of vitiated air by adults in crowded workshops and manufactories, renders them weak and apathetic; for relief they resort to the dram. The inhabitant of a malarious region persuades himself that the morning dram, or anti-fogmatic, is necessary for the preservation of his health. This is another way in which the subject of health is connected with *temperance*. As the care of health implies cleanliness, so in that as well as other ways, it prepares a population for *religious instruction*. By removing the miserable inmates of cellars and crowded dens in your cities, the strongholds of vice and the nursery of crime, and disease will be destroyed. The community will thus reap the same advantages as in feudal times resulted from the destruction of baronial castles, the refuge of titled robbers. Thus it will be seen that the matter of public health is intimately connected with that of education, temperance, religion, morality and the direct prevention of crime.

"In the present day," says Dr. Arnott, "we do not look for the occurrence of preternatural or miraculous events among the phenomena of living bodies, any more than of the earth itself, or of the heavenly bodies. So every disease is an occurrence perfectly in the course of nature or according to the laws of the Creator." "Certain preceding occurrences have brought on or caused it and these antecedents or causes may be studied and analyzed."

Some of the causes when slight in degree act so slowly as to be long unperceived by the sufferers, as in instances of insufficient exercise, faulty ventilation, certain kinds of food and drink and a residence in unhealthy regions, which affect a whole population to a certain extent, though a portion only of it are sick enough to suspend their labor, and of which the full extent is seen only after successive generations.

All this is seen in the lower animals which are well known to be modified by climate, food, exercise and care.* "Under the most favorable circumstances," says Dr. Ware, president of the Massachusetts Medical Society, "where there is neither depreciation of health, nor abridgment of life, the annual income might be more than doubled, and the comfort and happiness, moral dignity and intellectual power of the commonwealth might be increased in proportion." In view of our malarious climate, this statement is even more applicable to the State of New-York than to the commonwealth of Massachusetts.

State and municipal authorities have dictated the mode of building for the protection of property, but not for the protection of health. The interests of trade are protected by severe penal enactments against forgery and in various other ways ; deer and other game, with the products of the sea are protected ; but the greater interests of life and health of man are comparatively neglected.

It is the boast of our State that she has sent forth her professors of geology, of botany and of chemistry, (sciences which I may remark owe their origin, in a great measure, to medical men,) and they have surveyed it, examined its soil, its minerals and its animals, and discovered large sources of wealth. New-York has her State and county agricultural societies, supported and fostered by the State, and rewards are given to those whose "talk is of cattle," for oxen and swine of morbid fatness, and of new and better breeds, and for new and better fruits. Let such associations go on and prosper ; by their labors nutritious grains and fruits, alike pleasant and healthful, have become more abundant, larger and more highly flavored ; domestic animals also have become better fitted both for labor and for food. The State therefore most wisely provides, not

* See Dr. Neil Arnott and local Sanitary reports.

only for the advance of scientific and agricultural knowledge, but also for its general diffusion.

Will she not go a little further, and see what can be done for the protection and the improvement of the physical condition of another laboring animal?—an animal whose labor is vastly more profitable than that of any other, and whose place is at the very head of creation. No other subject of such vital importance ever has, or ever can, engage the attention of the Legislature. Dividing the 100 years, from 1729 to 1829, into 5 periods, each of 20 years, it appears from the records published by the Registrar General, that the deaths of children under five years of age were, in the

1st	20 years,.....	71.5
2d	"	63.0
3d	"	51.5
4th	"	41.3
5th	"	31.0

Thus whereas nearly three children out of four died under five years, now less than one in three. There is no good reason why one in ten should die.

You have made large contributions for the education of the children and the youth of the State, and to some small but very inadequate extent, of your physicians. Equally does it become a wise and liberal government to adopt means for improving the physical condition of the people. Without bodily health and sanity of mind, in vain are all efforts to elevate the moral and intellectual character, to increase the virtue and happiness, no less than the productive power of the people. This is a subject that addresses itself to the feelings and the interest of all. Are you a parent? We desire to search after sources of mortality among your children, and to remove them so far as they may be moveable. Are you a farmer? We seek to give increased value to your possessions, increased strength to your laborers, and to perpetuate your property in the hands of your posterity. Are you (as who is not) a friend of the common schools? We are striving to keep sickness and death from among your scholars, and to preserve them in a condition fit to receive instruction.

New-York is called the Empire State. Who in all future time will wield her sceptre and possess her fair heritage ? The descendants of those who are now her people? Not if they become physically and intellectually inferior to their neighbors. A degenerate race will rapidly melt away and give place to immigrants of harder constitution, and greater vigor of mind. History abounds with facts conclusive on this point. In the city of Paris, containing 800,000 of inhabitants, not 1,000 families (less than $\frac{1}{2}$ per cent) have lived there so far back as the time of Louis XI. Look at our own commercial capital, what a small remnant of the Hollanders and the Huguenots is left. A single century will probably produce a similar revolution in the island of Manhattan, unless a better physical and mental training is given to her children. What money can do for the education of children, is for the most part done already. What nature's inexorable laws require for health, is yet almost entirely neglected. The style of your legislation, is "*The People of the State of New-York.*" In Massachusetts and Virginia, it is "*The Commonwealth.*" The terms are alike appropriate and significant. The people are the commonwealth of the State ; not the sick, aged or decrepid, but those who are capable of useful and productive labor. Take care of the property of the people, take care of their morals, provide for their education ; but forget not the duty that underlies all other, take care of their lives, take care of their health.

And now gentlemen having pointed out evils of great and appalling magnitude, and asking your attention to the paramount importance of fostering the interests of *medical education*, in regard both to public and private Hygiene, permit me to add that in relation to public health many questions are constantly arising which it is of the utmost importance to determine without delay, and on which no medical man nor, as I believe, all the medical men in the State are competent to give a sound opinion without long and careful preparatory study, with the whole force of their minds directed to those special subjects.

It is of the utmost importance that you have an efficient quarantine.

A sanitary survey of the State or enquiry into the existence and sources of unnecessary disease.

With great deference to the superior wisdom of many here present, I would suggest, if other and better remedies be not presented, that a bureau or board should be constituted, to whom should be referred all measures of legislation and private undertakings which might injuriously affect the public health, and that should be charged with devising and recommending plans for the removal of sources of disease already existing, to which the counties and towns might refer for information adapted to their local necessities. To each town or county might be left the execution of such measures as the health of that town or county might require, and in case the co-operation of two counties was necessary the State should pass the requisite law. You have your law officer, your state engineer and Canal Board, should not the public health of the State have recognized guardians.

But whatever plan legislative wisdom may adopt, this fundamental fact must be recognised, viz : that a scientific and medical element has become essential to the due organization and administration of your State government. The importance of the ends in view, the magnitude of the means required, render it idle to trust to impromptu advice and opinions.

As a matter of humanity, as a matter of good policy and of morals ; as a matter of finance alone, it warrants and will repay a large outlay, and in my opinion it will be their own fault if the people of New-York, with their abundance of wholesome food, good climate, their comparative freedom from enervating vices, improving religious and intellectual culture, do not gradually, nay rapidly, diminish the frequency of disease among them, and bring the average age of her citizens nearer to its allotted period of threescore years and ten.

APPENDIX.

On the Sanitary Construction of Country Dwellings, Ventilation, Drainage, &c.

The site for a country residence should be chosen in reference to its height above the adjacent ground, its exposure, its drainage, and the quality of its water. Springy grounds should be avoided. If there is in the vicinity a swamp or marsh, or other source of disease, the site, if practicable, should be to the windward, that is, to the westward of it, as westerly winds are the prevailing winds in this country. In all countries the winds, and in the State of New-York the northwesterly especially, are the great natural ventilators or purifiers of the air. They dilute and carry off poisonous exhalations of all kinds. If between the site and an unhealthy spot there is a wood, it should be left for a screen. If not, a screen of evergreen or other dense growing trees should be made, that will attain a height of at least twenty feet; and should there be high ground adjacent, without an intervening valley, the water should be cut off by a drain lower than the foundations, and carried around the house. A marsh with wood on it is less noxious than when cleared; the trees therefore should be left, unless it be immediately drained. A well near a house affords a good drainage; the deeper it is the better. Where drainage is difficult, the water in the well being near the surface and abundant, it may be raised by a windmill and carried off, generally at a trifling cost. This was formerly done in Lincolnshire in England. Steam engines are now employed. The Onondaga valley has been rendered comparatively healthy by means essentially similar, and perfect drainage, even in situations apparently not requiring it, contributes to health by rendering the air drier. Trees should not be left too near the house, nor should rank herbage be permitted to grow and decay in the immediate vicinity.

Where there are not other strong reasons for a different plan, a southeasterly aspect is best adapted to make healthful residences. Trees on high land on the northwest are a protection in winter. Whatever the aspect of the house, the south side should have its full share of windows. Southerly windows are the most pleasant

in winter, and are unobjectionable at all other seasons. The construction of houses on piles, as very commonly practised in the southern states, and as I am told in some of the West India islands, is conducive to health in malarious regions.

When constructed with stone foundations, the cellar may be used as a dairy, and this presupposes ventilation and extreme cleanliness, which are promoted by ceiling it and making it light. But no wood, or vegetable, or decaying matter of any kind should be placed there. The cellar should communicate with the air above the house by a flue in the chimney stack. In failure of this it should be well ventilated, except during extreme cold weather, by lateral apertures, especially during the vernal, summer, and autumnal months. If any part of the cellar is floored, the air should be drawn from beneath the floor into a chimney flue. These are best when made round, and for anthracite coal should not even in the highest houses exceed eight inches in diameter. The round form draws better, and the air is not drawn from one flue into an adjoining one. Tredgold says that for bituminous coal the diameter of the flue in inches should be equal to the square root of the height in feet: thus 50 feet high would require ($7 \times 7 = 49$) seven inches. If less than seven inches, they are difficult to construct. A common cause of smoking, is the making the flues so large that they allow the cold air, especially at their corners where their form is rectangular, to descend and mix itself with the heated ascending air.

Every bed-room, especially if small and without a chimney flue, should have a ventilating aperture not less than four inches square, communicating with the attic above, and led through the roof by a proper conductor; unless the door into another room could be left open, in which case no farther means of ventilation are required. No bed-room, except for winter use, and with a fire in it, should be located on the principal floor, much less on the ground floor should there be one. Bed-rooms on the second floor are healthful, and those on the attic floor still more so. During a season of great mortality from bilious fever, a friend of mine, the physician of a village in the neighborhood of New-York, with his whole family, slept in the attic directly beneath a wooden roof; not one of them were affected with fever, although they felt the heat uncomfortable during the early part of the night.

Piazzas, in so far as they invite persons to sit on them during the summer and autumnal evenings, are unhealthful, except those on the southerly or westerly sides of houses built with stone or brick, which by retaining the heat imparted to them by the afternoon sun render the air dry and healthful until a late hour at night. A veranda with windows is not liable to the same objections.

Every one knows how agreeable is the impression of the sun's light to persons in health. The instinct of every one, especially after long confinement, is to bask in the sun. Without light, men and animals become sickly, and soonest when the air is cold and moist, when fed on too weak aliment, tubercles being formed in their lungs and other organs.

The windows and chimney of a room represent a syphon, with one branch perpendicular and the other horizontal. The proper action is for the air to enter at the doors and windows, and rise in the flue; but this action may be inverted when a low building communicates with a higher one by a close gallery; when the air is colder in the flue than in the rooms; and when it is forced down by descending currents of wind. Dr. Arnott, of England, has invented a self-closing valve, which prevents a back current. It is designed to be inserted in the chimney flue near the ceiling of the room. The gases of a cold chimney flue are disagreeable and injurious to health when they descend into the room.

A fire in damp weather, during the autumnal evenings, and even in the cool evenings of summer is exceedingly healthful. If circumstances render the use of a lower room as a bed-room unavoidable, a fire in the early part of the evening should always be made during the sickly season. Besides its agreeable warmth and cheerful light, it ventilates the room, introduces fresh air in place of that which by stagnation may have become impure, and dries the air so introduced. Dry air is not a vehicle for malarious emanations.

"In a large barrack for soldiers at St. Petersburgh," says Dr. Wylie, "on one side was well exposed to the sun, the other, always shaded. In a series of years, the sickness on the shady side was constantly three times greater than on the other." Therefore, sitting rooms should be well lighted by the sun's rays.

According to Péclet, a tallow candle, six to the pound, consumes

Missing Pages 27-28

doing the same in order in the first case to permit the escape of heavy gases by descent and in the second of light gases by ascent. But where a current of air sweeps along undrained land, it prevents or soon carries off the fog even though it is undrained.

The second report of the Metropolitan Sanitary Committee states that it has been proved that drainage in England has elevated the temperature on some occasions six degrees and that evening chills are no longer experienced in well drained localities. In this State the temperature is stated to have been raised 15° by drainage. Thus comparative immunity is afforded not against marsh fevers only but cholera, rheumatism and acute inflammatory diseases.

In the statistical account of Scotland are found among many others the following notices of the great advantages derived from draining. In *Fourdown*, "so much drainage that now no sickness; formerly agues common, now quite unknown;" in *Carmylie*, "health improved from drainage, Kennon agues very prevalent sixty years ago, now never met with," and a long chapter is filled with similar statements from all the rural districts of England and Scotland. But why need I look abroad. Here, in Onondaga valley, health is much improved by its drainage and the experience of every one will supply facts in illustration.

It is not sufficient to dry only the surface of the ground by drainage, in order to prevent effectually the formation of miasmata; it is essential that the drainage should be deep and thorough, for the poison may emanate from moist decaying vegetable matter below. Dr. Ferguson cites many facts in proof of this statement, among others the following: that the British army encamped on the dry bed of a river in Spain, having a stony bottom, were greatly affected with fever. The required depth of the drainage probably depends on the duration and intensity of the solar heat. Less than 4 feet I should not entirely rely on in our climate. Is it not probable that the Croton water, containing as it does much vegetable matter, may be a source of disease in the streets of New-York, to which it is so abundantly applied.

The modern art of engineering employs new and cheaper means than were formerly used for draining. I allude to the substitution of small pipes for larger drains, from the discovery of the fact that

they are less liable to become obstructed, provided they have a descent of not less than 1 per cent of their length.

“Now it is proved that whilst house drains of such sizes and construction as have been enforced by the commissioners of sewers, accumulate deposit, drains of a much smaller size keep perfectly clear. Thus whilst a 12 inch drain, which is required by the Kent and Surrey, and the tower hamlets, and the city commissioners, accumulates deposits and generates noxious gases, a tubular earthenware drain, of nine times less capacity, or of four inches in diameter, as here represented, or proportional to the house of from



three to six inches, keeps perfectly clear. Even three inch drains convey away the refuse from middle-sized houses, and keep perfectly clear, whilst the larger permeable brick drains, which are usually charged three times the price, are choked up.”

Mr. Roe, the surveyor of the Holborn and Finsbury district of sewers, who led the way in systematic improvements in the form and construction of main lines of sewers in the metropolis, recently, at our suggestion, made experiments on the rate of flow of water through the common brick drains for houses, as compared with the rate of discharge through earthenware drains of the same capacity, and with the same run of water. The general results which he gives are, that through the earthenware tubes the rates of discharge are increased to an important extent—in the smaller and more frequent forms, to the extent of more than a third. In other words, an economy of one-third the quantity to obtain the same result is effected by them, and the general efficiency of the drainage in ordinary runs proportionately augmented, as will appear, at a greatly reduced price.

“The following are examples:—

Table of the comparative run of water through brick drains and glazed pipes.

Inclination.	Depth of water.	Time through glazed pipes.	Time through brick drain.
Level,.....	5 inches	38	50
2 inches in 50 feet,	4 $\frac{1}{2}$ "	16 $\frac{1}{2}$	25
1 $\frac{3}{4}$ " "	5 $\frac{1}{2}$ "	19	27
2 $\frac{1}{4}$ " "	3 "	18	26
1 $\frac{1}{2}$ " "	3 $\frac{1}{2}$ "	25	36
3 $\frac{1}{4}$ " "	4 "	15	22
2 $\frac{3}{4}$ " "	6 "	13 $\frac{1}{2}$	21 $\frac{1}{2}$ "

First Report of Metropolitan Sanitary Commissioners.

Mr. Chadwick, of London, has received from Switzerland a pipe which has served for drainage 500 years without injury or obstruction, under the pressure of a great head of water.

